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Citation for published version:

Knox, J 2017, Playing with student data: The Learning Analytics Report Card (LARC). in S Shehata & JP-L Tan (eds), *Practitioner Track Proceedings of the 7th International Learning Analytics & Knowledge Conference (LAK17)*. SoLAR, Vancouver, pp. 43- 49.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

Practitioner Track Proceedings of the 7th International Learning Analytics & Knowledge Conference (LAK17)

Publisher Rights Statement:

This is the final published version of
Knox, J 2017, Playing with student data: The Learning Analytics Report Card (LARC). in S Shehata & JP-L Tan (eds), *Practitioner Track Proceedings of the 7th International Learning Analytics & Knowledge Conference (LAK17)*. SoLAR, Vancouver, pp. 43- 49,
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Playing with Student Data: The Learning Analytics Report Card (LARC)

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ABSTRACT: While the field of Learning Analytics continues to develop, examples of student-focused projects have been in short supply. This paper will describe the design and implementation of the Learning Analytics Report Card (or LARC), an experimental project undertaken at the University of Edinburgh. The LARC involved postgraduate students as research partners and active participants in their own data analysis, and used data-to-text methods to generate a written textual report. The LARC allowed students to ‘play’ with their own data; choosing *what* to include or exclude, and *when* to generate the report. This paper will summarise key findings from the project.

Keywords: LARC, LMS, Moodle, data-to-text, student-focused, digital education, critical data studies.

1 INTRODUCTION

The Learning Analytics Report Card (LARC) was a small-scale pilot project undertaken at the Centre for Research in Digital Education at the University of Edinburgh. This paper will outline the development and implementation of the project, the main features of the LARC, as well as an analysis of student responses. The central question underpinning the project was: How can students and university teaching teams develop critical and participatory approaches to educational data analysis? The two principal aims were, firstly, to develop a means of capturing LMS data and creating a textual report from the results, as well as providing students with the capacity to choose what kind of data is used, and when the report is generated. Secondly, the project aimed to promote a critical understanding of data analysis in education amongst students. Student involvement in the project was incorporated at all stages of the project. The design, development, and testing phases of the LARC were informed by formal student representation, and this was motivated by a general concern for ethical practices in data collection.

2 THE LEARNING ANALYTICS REPORT CARD (LARC)

The LARC functioned by capturing student’s course-related activity data within an institutional LMS (Moodle), and presenting a summary of an individual’s academic progress in the form of a textual report. However, rather than manifesting exclusively through hidden and inaccessible institutional data aggregation and analysis, the LARC offered students an opportunity to ‘play’ with their data; to choose what is included or excluded, and when the report is generated – hence the acronym ‘LARC’. This facility

for choice, although limited, was intended to explore the capacity for participation while still retaining the 'reporting' function of learning analytics. The LARC interface consisted of a web form, accessible only through the institutionally protected login, which provided various options for generating the report (see fig 1).

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Choose what you'd like the report to cover:

Introduction to Digital Environnr

w/c 12 Dec 2016

☒ Attendance

☐ Engagement

☐ Social Interaction

☒ Performance

☐ Personal

Ok, report on me!

Figure 1: The LARC web form interface

Drop down boxes at the top of the interface allowed users to select a course from which to generate the report, and importantly, the specific week from which to view activity (see fig 1). This choice of *when* to generate the report was considered a crucial part of learner agency within the project, and students were encouraged to take charge of the process and activate the LARC whenever they desired.

Student choice related to the content of the report, and thus the kind of data that the LARC would capture and analyse, was facilitated through the selection of report themes: 'attendance', 'engagement', 'social interaction', 'performance', and 'personal' (see fig 1). These were intended to suggest different perspectives on course activity, and allowed students to select one or more to generate the report, and

thus tailor their subsequent result towards particular aspects of their course interactions. Basic data was gathered from specific areas of the LMS for each report theme: 'attendance' from date and time of login; 'engagement' from frequency of interaction with course resources; 'social interaction' from discussion forum module data; 'performance' from aggregating the other theme data and comparing it to the student group; and 'personal' from interactions with profile information and introductory course tasks.

Algorithmic calculations and data-to-text processes (see Isard and Knox 2016) were developed to present this data in the form of a 'report card', consisting of a number of automatically generated sentences that corresponded to the report themes selected by the student (see fig 2).



Figure 2: An example anonymised report from the LARC, showing a number of sentences produced from selected report themes.

Following student feedback and a further stage of development, the LARC reports were amended to include sample data, improved individual comparisons, and sentiment analysis of forum posts (see fig 3).

Your Report:

You chose: attendance, engagement, social, performance, personal

Your attendance has in general been excellent but this week you logged on less often than usual.

You have mostly been very engaged with the course content and this week you seemed more interested in the topic than usual.

You have usually been extremely social during the course and this week you interacted more with others than usual. Most of your forum posts have been positive in tone, some have been neutral, and none have been negative.

You do not really care what others in the class think about you.

You are in the lowest third of students for social interaction and engagement, but the middle third of students for attendance.

attendance: your total this week=14 your average=16 course average=30

engagement: your total this week=64 your average=48.67 course average=143.1

social_interaction: your total this week=30 your average=13.67 course average=44.71

forum posts: positive=4 negative=0 neutral=2

Leave a comment



| [View my archived reports](#) | [LARC Project Site](#)

Figure 3: An example of the second stage LARC report, showing sample data, improved individual comparisons, and sentiment analysis of forum posts.

A facility for students to add comments was provided underneath each report (see figs 3 and 4), and was intended to expand the scope for interactivity in the LARC. Comments encouraged students to reflect, not only on their activity within the course, but also to critically discuss the efficacy of the generated report, the kind of language used, and experience of participating in decision-making (and the lack of it) concerning the analytics process itself. Through facilitating choice in the report themes, learners had the ability to reflect on what an 'active', 'engaged' or 'valued' student might be, and to recognise how the automated algorithmic processes of data analytics might interpret their online activity, and make decisions behind the scenes to which they were not party (see student feedback section below). All generated reports were archived and available to individual students, and any report could be downloaded and shared if desired.

3 IMPLEMENTATION

The LARC was piloted on three option courses within the MSc in Digital Education offered by the University of Edinburgh; a fully-online postgraduate programme. Over three 12 week semesters, 75 students participated. In the first semester, 208 reports were generated, 26 of which were accompanied with student comments. Data from the second semester is currently being analyzed for presentation at LAK17. Rather than operating independently from the courses in question, the LARC was aligned with already existing course themes (including learning theory, online presence, and digital research methods), and introduced as a provocation for critical reflection on the data analysis in higher education.

4 ANALYSIS

Although limited due to the small-scale nature of the initial pilot, data from the LARC project offers some productive insights into how student participation in Learning Analytics might be explored.

Figure 4 shows the dates and times when LARC reports were generated during the first semester of the pilot study. Given that new LARC reports were available at the beginning of each week, this type of analysis could reveal the time of the week at which students decided to view their latest report, and thus when they were motivated to reflect on the previous weeks activity.

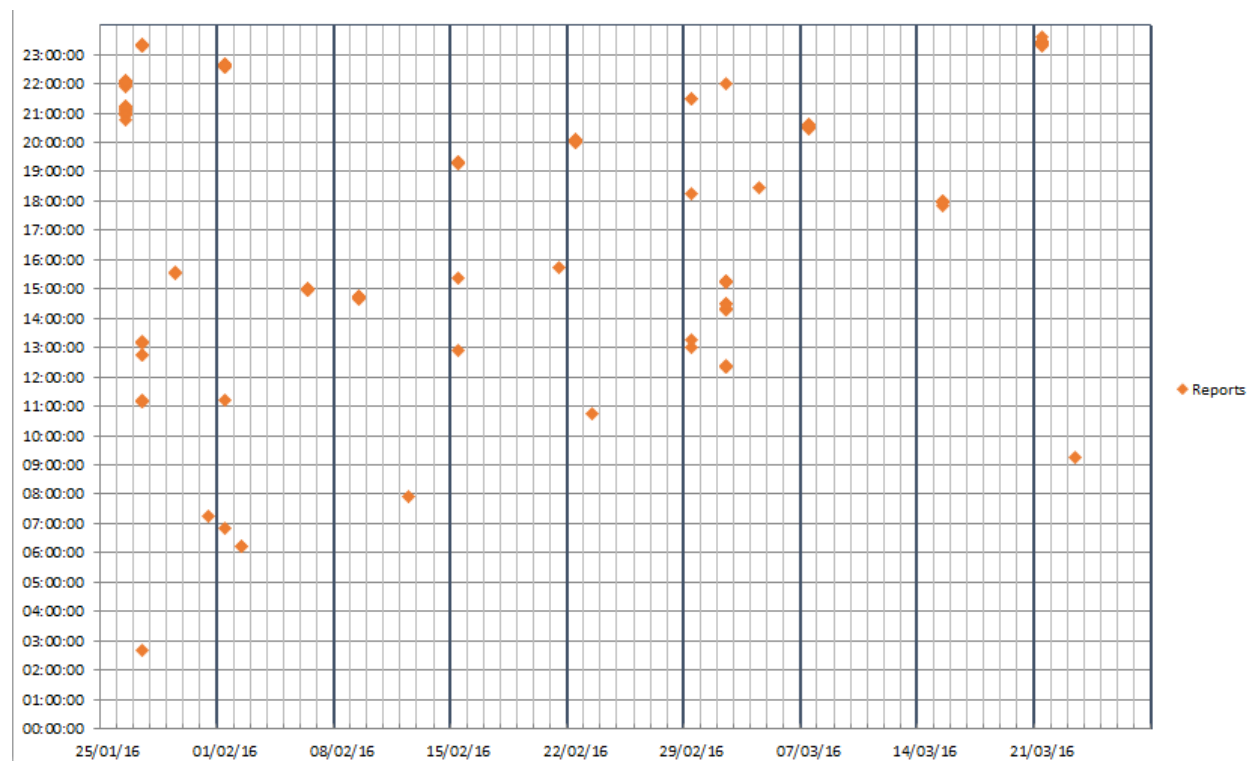


Figure 4: A graph showing the date and times when LARC reports were generated, during the first semester of the pilot.

Figure 5 shows which archived reports were accessed when LARC reports were generated. This kind of analysis could be used to determine the extent of student interest in reflecting on the sequence of their activities and performance throughout a course. A larger number of archived reports accessed might indicate that a student is concerned their overall course progress, and trying to understand their current performance in the context of the course as a whole. Accessing specific weeks from the archive might indicate a concern with particular topics within the course, and could be mapped onto course themes.

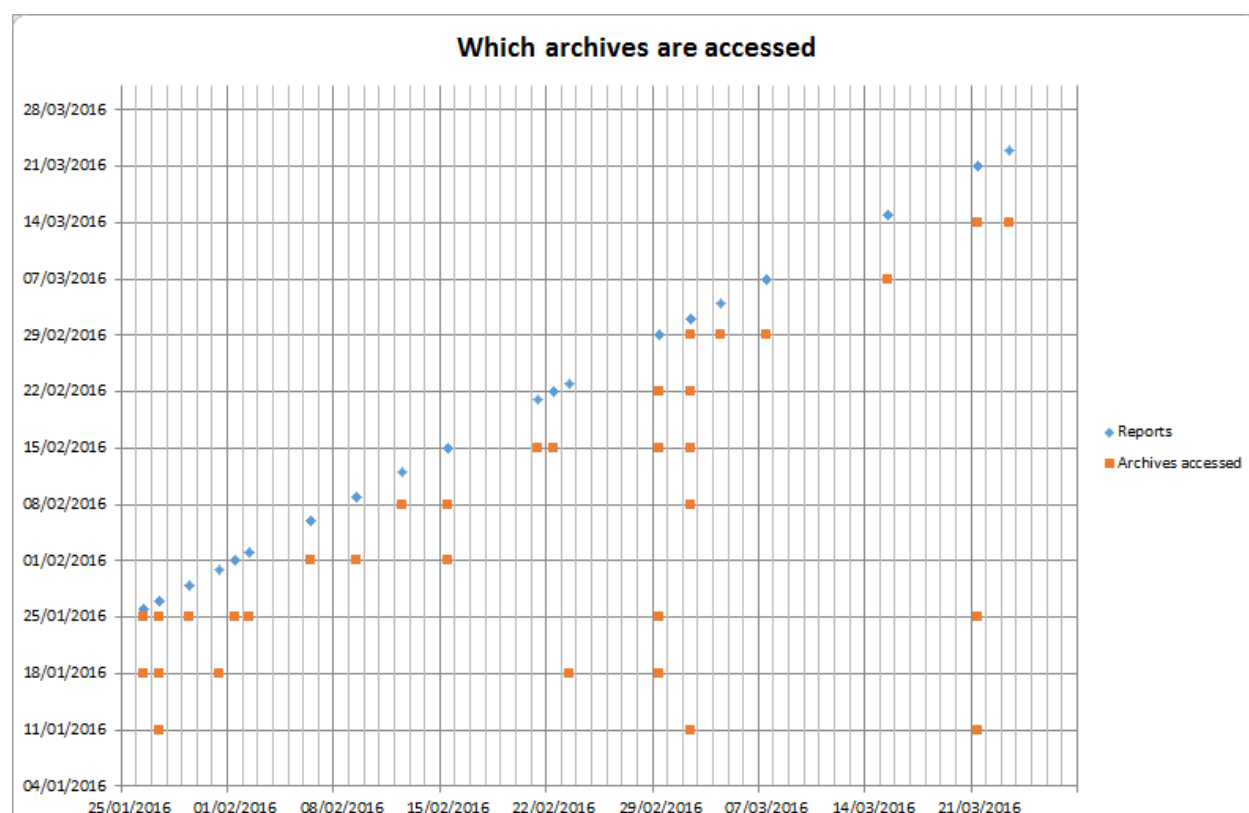


Figure 5: A graph showing which archived reports were accessed when LARC reports were generated

5 STUDENT FEEDBACK

Although limited at this stage, student feedback offers ways of working towards an understanding of whether the LARC was able to foster a critical awareness of data analysis in education amongst students (project aim 2). Comments revealed themes of ethics, privacy and surveillance, pedagogical relationships, and trust (see Knox 2017 for a fuller discussion). On the whole, a concern for the accuracy of the analytics, and the experience of receiving automated feedback was apparent. This was perhaps due to the novelty of the activity, as expressed by one participant: “to have “computerised” (through human generated algorithms of course) feedback is a newish experience!” Nevertheless, an awareness of the entanglement of social and technical concerns is expressed in this comment, showing an awareness of the complex issue of agency in data analytics. Critical views were also expressed, one participant commenting:

it cannot account for the time I might have been engaging informally with the course (thinking about my dissertation topic, dipping into the course textbook, the level of interest demonstrated in the first assignment).

This highlights concerns about the ability of data analysis to capture the full range of learning activities, suggested by this student to involve a range of spaces and times outside of direct interaction with the LMS. This is mirrored in a comment from another participant:

it is possible for a student to be not fully engaged with the course content but still engaged with reading material from other related sources... How would the tutor know this from analytics only?

Another comment highlights the hidden and inaccessible aspects of analytics, and suggests a concern for privacy: “should students be made aware of how analytics are functioning and how they might feel as though they are being ‘watched’. Or does this only add to the creation of a surveillance culture?” This suggests the need to develop ethical awareness in educational data analytics.

Elsewhere, another participant revealed a distrust of the LARC reports, stating: ‘I need to observe the results over a period of time before I can gain more confidence in the information it's providing.’ This suggests an importance given to relationship building in educational activity, and calls into question the transactional functions that automated systems tend to supply.

Further research of student perspectives, I suggest, will offer important ways of understanding the development and implementation of analytics, and will provide crucial insights about how to use data analysis *with* students, as active participants in the emerging field of Learning Analytics.

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